

IC5.1: Optional Job Sheet

A Review of QG Theory and Potential Vorticity

Objective: Apply the knowledge gained from the winter weather AWOC IC 5 Lesson 1 training module to a case study.

Data: 15 March 2004 winter storm event in the Midwest. You will be using your WES machine in case review mode.

Instructions:

On your WES machine, load the 15 March 2004 case, DMX localization, and set the clock to 15 March 2004, 13:00 UTC. **Focus on the 12 UTC 15 March NAM 80 analysis for each question in this jobsheet, unless otherwise noted.**

On the regional map scale, load NAM 80 500mb Height, geostrophic wind, and ageostrophic wind

Question 1. Where are the QG assumptions valid and invalid at the 12 UTC 15 March analysis time? (location detail such as “northern Missouri” would suffice) Explain why.

On the regional map scale, load a NAM 80 potential temperature, height, Q vectors, Div-Q, Qn, and Qs at 3 layers: 700-500 mb, 500-400 mb, and 400-300 mb. Answer the following questions.

Question 2. Focusing on each layer, where is the upward forcing located on the 12 UTC 15 March NAM 80 analysis? If there is no upward forcing, answer “None”.

700-500 mb layer forcing:_____

500-400 mb layer forcing:_____

400-300 mb layer forcing:_____

Question 3. In which layer does the Q_s pattern favor the development of a thermal ridge?

On the regional map scale, load a NAM 80 tropopause map (use “trop” under the misc. planes menu in the volume browser) with wind vectors, potential temperature, and pressure.

Question 4. Where are the jets, trough, ridge?

Jets located: _____

Trough located: _____

Ridge located: _____

Question 5. Where is air of stratospheric origin being lowered into to the mid-troposphere?

Stratospheric Air: _____

Question 6. Bonus question since IC5.1 didn't explicitly cover this: Will the trough strengthen or weaken? (circle one) Explain your answer.

Question 7. Will the jet progress south and east or remain nearly stationary over the next 6 hours?

Question 8. Are there any areas where a low-level front (or frontogenesis) could be enhanced due to the influence of the PV anomaly? (You'll have to load a pane displaying low-level thermal gradients to answer this one)

An answer key is available for this job sheet. Please see your local AWOC Winter Weather facilitator to obtain a copy.

